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Development of A Water Quality Status and Trend Detection Tool*

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ABSTRACT

Water Quality Index (WQI) models have been developed since the early 1970s. They present a means by which water quality status and trends can be compared across time and space on the basis of a composite value computed using existing water quality data. There is a need for a tool that can bring the different water quality parameters together and calculate the WQIs so as to facilitate data use in predictive modeling and water quality management. We are developing a software tool that can be used by water quality managers and others with different technical backgrounds to calculate WQI of the water source in order to determine water quality status and predict potentially harmful conditions. In this paper, we describe the tool that we have developed and its effectiveness in calculating WQIs and presenting visual analysis of the data. The tool is developed using Python as the base language. Tributary data from 4 watersheds in the Western Lake Erie Basin from National Center for Water Quality Research (NCWQR) at Heidelberg University was fed into the software tool and results were obtained. In its preliminary state, the tool is able to read, process and analyze any amount of data from an Excel file when presented in the right format. Current outputs show interpretive water quality in the Western Lake Erie Basin, which has been bad (WQI < 39) to medium (39 < WQI < 70) over the years, presented as time series charts with trend lines as well as tables. Future developments will include more in-depth predictive analysis as well as provisions for multiple file types and formats. In the future, we expect that the tool will be flexible enough that it can be adapted to other areas beyond the study region.

KEYWORDS

Water Quality Index, modeling, software tool, visual analysis, predictive analysis, Western Lake Erie Basin